CLAIMS:

1. A method of scheduling traffic from a plurality of queues onto a link, at least one of the queues having an agreed bandwidth requirement and at least one of the queues having no agreed bandwidth requirement, the method comprising the steps of:

assigning a weight to each queue having an agreed bandwidth requirement, the weight being determined in dependence on the bandwidth requirement;

grouping the queues having no agreed bandwidth requirement into a group, Q*, and assigning a weight to the group;

scheduling the queues for transmission on the link in dependence on their assigned weight and on a last transmission time for the respective queue, wherein if a scheduled queue has no traffic to transmit another queue is scheduled, the group Q* being scheduled after the other queues.

2. A method according to claim 1, in which a weight for a queue having an agreed bandwidth requirement is determined in dependence on the ratio of the queue's required bandwidth to the available link bandwidth, a queue with a low weight being scheduled for transmission before a queue with a higher weight.

3. A method according to claim 2, wherein the weight W_N, for a queue, Q_N, is calculated as:

$$W_N = \frac{RL}{RN} x STEP$$

where a value, STEP, is defined as the lowest assignable weight, R_L is the link bandwidth and R_N is the queue's required bandwidth.

4. A method according to claim 3, in which the group Q* is assigned a weight of STEP.

5. A method according to claim 4, in which the step of scheduling queues includes the steps of:

maintaining a global counter, G;

maintaining a counter for each queue, counter C_N being the counter for queue Q_N;

incrementing C_N by the W_N and G by STEP each time a queue, Q_N, is scheduled for transmission and has traffic to transmit, wherein a queue, Q_N, is scheduled for transmission only if $C_N <= G$.

6. A method according to claim 5, in which the step of scheduling queues further comprises the step of ordering the queues in increasing rank of their respective weights, the group Q* being ordered last, wherein the step of scheduling queues processes the queues in accordance with said order.

7. A method according to claim 6, further comprising the steps of assigning the global counter, G, a maximum size in bits and determining an end point, U,

$$U = 2^{(\text{max size in bits } -1)}$$

wherein, when G reaches or exceeds the value of U, G is reset to a predetermined value, L, and counters C_N are reset to C_N - (G-L) or 0, whichever is greater.

8. A method according to claim 7, wherein the predetermined value, L, is set at 2 x STEP.

9. A method according to claim 7, wherein the maximum usable weight is set at U-STEP.

10. A traffic control system comprising a traffic controller arranged to process traffic from a plurality of queue's to schedule the traffic on an outgoing link, the plurality of queues including at least one queue having an agreed bandwidth requirement and at least one queue having no agreed bandwidth requirement, the traffic controller being arranged to assign a weight to each queue having an agreed bandwidth requirement, the traffic controller determining the weight in dependence on the bandwidth requirement, to group the queues having no agreed bandwidth requirement into a group, Q*, and assign a weight to the group Q*, and to schedule the queues for transmission on the link in dependence on their assigned weight and on a last transmission time for the respective queue, wherein if a

scheduled queue has no traffic to transmit another queue is scheduled, the group Q* being scheduled after the other queues.

11. A system according to claim 10, in which the traffic controller determines a weight for a queue having an agreed bandwidth requirement in dependence on the ratio of the queue's required bandwidth to the available link bandwidth, the traffic controller being arranged to schedule a queue with a low weight before a queue with a higher weight.

12. A system according to claim 11, in which the weight W_N, for a queue, Q_N, is calculated as:

$$W_N = \frac{RL}{RN} xSTEP$$

wherein a predetermined value, STEP, is stored in a memory as the lowest assignable weight, and wherein R_L is the link bandwidth and R_N is the queue's required bandwidth.

13. A system according to claim 12, in which the group Q* is assigned a weight of STEP.

14. A system according to claim 13, in which the traffic controller schedules traffic from the queues by:

maintaining a global counter, G, in a memory;

maintaining a counter for each queue in a memory, counter C_N being the counter for queue Q_N;

incrementing C_N by the W_N and G by STEP each time a queue, Q_N, is scheduled for transmission and has traffic to transmit, wherein a queue, Q_N, is scheduled for transmission only if $C_N <= G$.

15. A system according to claim 14, in which the traffic controller is arranged to order the queues in increasing rank of their respective weights, the group Q* being ordered last, wherein the traffic controller processes the queues in accordance with said order.

16. A system according to claim 15, in which the global counter, G, is stored in a

register of length n bits, the controller being arranged to monitor the register for when its value reaches or exceeds a value, U, where

$$U = 2^{(n-1)}$$

wherein, when G reaches or exceeds the value of U, G is reset to a predetermined value, L, and counters C_N are reset to C_N - (G-L) or 0, whichever is greater.

17. A system according to claim 16, wherein the predetermined value, L, is set at 2 x STEP.

18. A method according to claim 17, wherein the maximum usable weight is set at U-STEP.

19. A traffic control system according to claim 10, in which the traffic controller includes a data structure in a memory, the data structure including storage means for a link to each traffic element queued for transmission, an indicator as to the last transmission time for a queue and a schedule for each queue indicating the next transmission time for a queue, the traffic controller scheduling traffic in accordance with the contents of the data structure.

20. A traffic control system according to claim 19, further comprising a further data structure, the further data structure being a copy of the data structure, wherein upon receiving a further queue to schedule the traffic controller is arranged to recalculate a transmission schedule in the further data structure including the further queue and to then schedule traffic in accordance with the contents of the further data structure.

21. A traffic control system according to claim 19, in which the traffic controller comprises an Application Specific integrated circuit.

22. A traffic control system according to claim 19, in which the traffic controller comprises a field programmable gate array.

23. A computer-readable medium, on which is stored a computer program of

instructions for a general purpose computer for scheduling traffic from a plurality of queues onto a link, at least one of the queues having an agreed bandwidth requirement and at least one of the queues having no agreed bandwidth requirement, comprising, in combination:

means for enabling the computer to assign a weight to each queue having an agreed bandwidth requirement, the means determining the weight in dependence on the bandwidth requirement;

means for enabling the computer to group the queues having no agreed bandwidth requirement into a group, Q*, and to assign a weight to the group;

means for enabling the computer to schedule the queues for transmission on the link in dependence on their assigned weight and on a last transmission time for the respective queue, wherein if a scheduled queue has no traffic to transmit the means schedules another queue, the means scheduling the group Q* after the other queues.

24. A program storage device readable by a machine and encoding a program of instructions for executing the method steps of claim 1.